

<b>REQUEST FOR RECONSIDERATION</b>	Application #	09/913,860
	Confirmation #	5469
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	First Inventor	MASUDA
	Art Unit	1797
	Examiner	Nguyen, Tam M.
	Docket #	P07340US00/BAS

Commissioner for Patents  
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S I R:

In response to the Office Action dated November 15, 2007, Applicants submit the following Request for Reconsideration.

Claims 7-16 and 18-24 are pending in the present application. Applicants respectfully request that the Examiner reconsider the rejections and find all claims allowable based on the discussion which follows.

Claims 7-16 and 18-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over JP-06-228570 (hereinafter "JP '570") in view of Masuda et al. (U.S. Patent No. 6,042,798) (hereinafter "Masuda") and Logsdon et al. (U.S. Patent No. 4,876,402) (hereinafter "Logsdon"). The Examiner alleges that JP '570 discloses a desulfurization process by contacting a raw hydrocarbon feed comprising methane, ethane, propane and butane with a catalyst comprising copper (Cu), zinc (Zn) and nickel (Ni) oxide in the presence of hydrogen (Examiner citing JP '570, paragraphs [0016]-[0029]). The Examiner admits that JP '570 does not disclose that the desulfurization process is operated at a space velocity (GHSV) of 200 to 10,000 h<sup>-1</sup>. However, the Examiner alleges that Masuda discloses a hydrodesulfurization process wherein the process is operated at a space velocity of about 1,000 h<sup>-1</sup>. Further, the Examiner alleges that it would have been obvious to modify the JP '570 process to

make the catalyst using the method of Logsdon, alleging that Logsdon teaches an "effective way to produce [a] catalyst."

In the Response to Arguments section, the Examiner alleges that Applicants' arguments that the catalyst of Logsdon does not absorb sulfur and that the catalyst of Logsdon is different from the invention composition in terms of composition, intended uses and functions are not persuasive. The Examiner alleges that the claimed method of making a catalyst is known in the art and that one skilled in the art would make the catalyst of JP '570 by any method, including the method taught by Logsdon.

Contrary to the rejection of the claims under 35 U.S.C. § 103(a), Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. Specifically, Applicants respectfully submit that the Examiner has failed to allege that the cited prior art teaches each and every element of the present invention, namely a method of desulfurizing a hydrocarbon raw material using the desulfurizing agent claimed.

The present invention, as cited in claim 7, is directed to a hydrocarbon desulfurization method which includes desulfurizing a hydrocarbon raw material using a specific desulfurizing agent. The present desulfurizing agent is made by the recited method which comprises mixing a mixture containing a copper compound and a zinc compound, calcining the resulting precipitate, forming a calcined precipitate into a shaped form of a copper oxide/zinc oxide mixture, impregnating the shaped form with iron and/or nickel, calcining the impregnated form to produce a calcined oxide, and reducing the calcined oxide with hydrogen to form a sulfur-absorbent desulfurizing

agent. Then, using the produced desulfurizing agent, a hydrocarbon raw material is desulfurized at a space velocity of 200 to 10,000 h<sup>-1</sup>.

Applicants respectfully submit that the prior art, individually or in combination, fails to teach a desulfurization method which uses the desulfurizing agent of the present method. Although in the outstanding Office Action, the Examiner alleges that JP '570 discloses a desulfurization process by contacting a raw hydrocarbon with a catalyst comprising copper, zinc and nickel oxide, Applicants respectfully submit that JP '570 fails to teach or in any way make obvious the claimed desulfurizing agent. Moreover, the Examiner has failed to make a *prima facie* case that the catalyst of JP '570 is equivalent to the desulfurizing agent which is used in the present method. The Examiner merely cites JP '570 paragraphs [0016]-[0029] as disclosing a desulfurization process using a catalyst comprising Cu, Zn and Ni oxides. And, although the Examiner cites the entire disclosure of Logsdon as teaching a process for making a catalyst as claimed, Logsdon does not teach the claimed process which produces the claimed desulfurizing agent or the claimed desulfurizing agent itself. Accordingly, the prior art, individually or in combination, fails to teach the present desulfurization method, as the prior art, individually or in combination, fails to teach or suggest producing a desulfurizing agent, let alone using that desulfurizing agent in a method of desulfurization, as claimed.

Furthermore, Applicants respectfully submit that Masuda and Logsdon, individually or in combination with JP '570, fail to teach or suggest the claimed desulfurizing agent, let alone use of the claimed desulfurizing agent in a desulfurization method which in any way makes obvious the present method. With regard to Logsdon,

Logsdon discloses a method of producing an aldehyde hydrogenation catalyst. As would be clear to one of ordinary skill in the art, Logsdon uses the word catalyst to define a substance that increases the rate of a chemical reaction without itself undergoing any permanent change. Thus, the aldehyde hydrogenation catalyst of Logsdon does not absorb sulfur or sulfur compounds in a substance. Accordingly, the catalyst of Logsdon fails to anticipate the present sulfur-absorption type desulfurizing agent.

Moreover, in accordance with *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. \_\_\_\_ (2007), references can only be combined if there is a reasonably apparent reason to combine elements in the fashion claimed. When an invention is composed of several elements previously known in the art, the combination is not obvious unless there is some reason for the combination to be made, such as a benefit from altering the closest prior art, to add or to remove elements which define the difference between the prior art and the claims at issue. Applicants respectfully submit that there fails to be any reasonably apparent reason which would have led one of ordinary skill in the art to modify JP '570 to arrive at the claimed desulfurization method which uses a desulfurizing agent produced by the method claimed. Furthermore, one of ordinary skill in the art would not be led to a method of desulfurization using a desulfurizing agent of the type produced by the recited method. Although JP '570 may, *arguendo*, teach a method of desulfurization using a catalyst comprising copper, zinc and nickel oxide, JP '570, individually or in combination with the other prior art references, fails to teach a method of desulfurization using a desulfurizing agent, let alone a desulfurizing agent which is the product of the method claimed.

Furthermore, Applicants respectfully submit that the prior art of Logsdon teaches away from being combined with JP '570. The JP '570 patent discloses a desulfurization method for desulfurizing a hydrocarbon using a catalyst that is formed by co-precipitation comprising copper, nickel and zinc oxide. The JP '570 patent discloses the importance of the catalyst being formed by co-precipitation (JP '570, paragraph [0017], etc.). Moreover, JP '570 discloses that a catalyst formed by impregnation has poor desulfurizing characteristics, resulting in a poor result when compared with one formed by co-precipitation (JP '570, Exp. 1, Com. Ex. 1 and Table 1).

Referring to the examples of JP '570 in more detail, Comparative Example 1 discloses performing a desulfurizing test using a catalyst comprising copper, nickel and zinc oxide formed by impregnation, and Example 1 discloses performing a desulfurizing test using a catalyst comprising copper, nickel and zinc oxide formed by co-precipitation. The test results shown in JP '570, Table 1, reveal that the catalyst formed by co-precipitation has a remarkably better desulfurizing effect than the catalyst formed by impregnation, even though they are both formed from the same constituents, namely copper, nickel and zinc oxide.

JP '570 would lead one of ordinary skill in the art to conclude that a catalyst formed by co-precipitation is excellent and desirable, and that a catalyst performed by impregnation is not preferable. On the other hand, Logsdon discloses an aldehyde hydrogenation catalyst prepared by both co-precipitation and impregnation.

One of ordinary skill in the art, based on JP '570 and Logsdon, would absolutely not be led to modify the desulfurization method of JP '570 by incorporating the Logsdon

catalyst or its process of manufacturing its catalyst, which includes impregnation, to arrive at the claimed method. JP '570 clearly teaches that it is not preferable to use impregnation in generating a catalyst. Therefore, one of ordinary skill in the art would not combine Logsdon with the desulfurization method of JP '570.

Furthermore, the product of the process disclosed in Logsdon is a catalyst for promoting the hydrogenation of an aldehyde to an alcohol. The material used in the desulfurization process of JP '570 is not a catalyst for promoting a chemical reaction, but rather a "sulfur-absorbing material." As would be apparent to one of ordinary skill in the art, the catalyst of Logsdon does not change during the hydrogenation process, while the desulfurizing agent of JP '570 does change, i.e. adsorbs sulfur during the desulfurization process. Therefore, the physical characteristics between the aldehyde hydrogenation catalyst of Logsdon and the desulfurizing agent of JP '570 are completely different and, therefore, are not equivalent materials.

Moreover, Applicants respectfully submit that the Examiner has failed to provide any facts to support an allegation that Logsdon teaches a process of making a catalyst, as claimed, and, therefore, it would have been obvious for one of ordinary skill in the art to modify the process of JP '570 by making a catalyst, as taught by Logsdon, to arrive at the claimed method. As would be readily apparent to one of ordinary skill in the art, in the chemical arts, i.e. an unpredictable art, one cannot substitute various processes for another with a certain outcome. The Examiner has failed to allege any facts to support a conclusion other than an unsupported "factual" statement that Logsdon teaches an effective way to produce a catalyst. Further, Logsdon and JP '570 are directed to two completely different catalysts and, absent any known benefit, one of ordinary skill in the

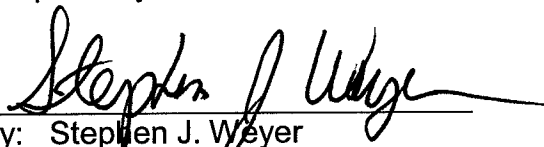
art would have no reason to be led to modify various aspects of the disclosure of JP '570 to incorporate the teachings of Logsdon. The Examiner's statements are merely conclusionary and are not supported by any facts.

Based on the foregoing, Applicants respectfully submit that the present application is not obvious in view of the cited prior art.

In view of the foregoing, Applicants respectfully request that the rejections be reconsidered and the present application be found to be in condition for allowance.

Respectfully submitted,

Date: May 15, 2008

  
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